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WASTE DISPOSITION

Waste Streams and Volumes

What are the current waste stream categories in the draft Waste Disposition RI/FS?

Consistent with the DFF&O, the Waste Disposition RI/FS must define the anticipated waste streams and provide an estimate of the volumes being considered for disposal either offsite or in an On-Site Disposal Cell. The necessary analyses to finalize such volume projections are presently underway. Consistent with the DFF&O, the RI/FS will evaluate the waste generated from the D&D of the Gaseous Diffusion Facilities including soil generated during their removal and waste/soil generated during the cleanup of environmental media. Consistent with a previous recommendation of the SSAB, the Waste Disposition RI/FS will also evaluate the anticipated wastes and volumes from the possible consolidation of some or all existing landfills should this option be selected and approved. For purposes of segmenting the anticipated waste to support the required analyses, the draft RI/FS utilizes the following waste categories:

- Debris and miscellaneous waste
- Concrete waste
- Process Gas Equipment (PGE)
- Incidental soils from building foundation and underground utility removal
- Metals with high potential to recycle
- Soil from RCRA soil clean-up program
- Landfill debris (note – there is no decision on the part of the DOE to excavate any existing landfills)
- Landfill soil

It should be noted that the above types of waste would include various regulatory categories of waste previously discussed at past SSAB meetings including low level radioactive waste (LLW), mixed low level radioactive (MLLW), PCB-contaminated LLW, classified waste, and radiologically contaminated asbestos-containing material (ACM). Other categories may also be added if an alternative involving excavation of existing landfills is selected.

How are waste volumes being estimated at this time?

The waste volume estimate evolves from:

- Field studies;
- Process knowledge;
- Lessons learned from other D&D projects of similar DOE facilities;
- Facility walk downs, including measurements of building structures and components; and
- Engineering studies, including review of as-built drawings.

The volumes are estimates of the in-place quantities of waste that would be generated under future D&D and environmental media cleanup activities based on best professional judgment, data, and engineering drawings.

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Waste Streams and Volumes

What could change these waste volume estimates?

The process to finalize the waste volume estimates is currently underway. Based on the current draft RI/FS, changes in the following could have significant impacts on the volume estimates:

- Changes in recycling criteria.
- Waste swell - As waste is generated, especially soils, the material expands around 10 to 30 percent. An as-generated volume will be considerably higher than an in-place volume estimate. This swell is considered in the required capacity calculations for the on-site disposal cell (if selected) or for off-site disposal (if selected).
- Greater soil contamination than estimated or the selection of significantly lower cleanup criteria.
- Issuance of a decision to excavate contaminated soil from areas of groundwater contamination.
- The volume projection for the possible excavation of landfills is limited to a select number of the existing landfills and therefore is subject to significant revision.

What are the current waste volume estimates?

NEW INFO

In order to properly evaluate the alternatives, the draft RI/FS is planned to evaluate the range of possible waste volumes including a reasonable low and high forecasted volume.

Assumptions for the Reasonable Base Case Volume Estimate

- ✓ Includes debris from building demolition and soil that must be excavated in order to remove the building and necessary foundations.
- ⊗ Base Case Volume does not include any existing site landfill materials.

Assumptions for the Reasonable High-End Volume Estimate

- ✓ Includes debris and soil from Base Case Volume Estimate.
- ✓ Assumes the landfills within perimeter road on the south side of the site will be excavated. The decision has not yet been made to take any additional actions on these existing landfills.

Waste Form	Estimated Volume (cubic yards)	
	Base Case Estimate	High-End Estimate
Soil incidental to building demolition	270,000	270,000
Debris and Miscellaneous Waste	540,000	540,000
Concrete Waste	530,000	530,000
Process Gas Equipment (PGE)	320,000	320,000
Metals with high potential to recycle	110,000	110,000
Soil from RCRA soil clean-up program	0	600,000
Landfill debris	0	300,000
Landfill soil	0	300,000
Total	**1,770,000**	**2,970,000**

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Waste Streams and Volumes

Assumptions included in the draft RI/FS preliminary waste volume estimate:

- Process gas equipment will be disposed without recycle.
- Only limited metal from contamination area can be cost effectively recycled due to restrictions, the current condition of the metal, and/or the levels of contamination.
- The 600,000 cubic yards of landfill soil and debris wastes included in the High-End case come from three existing landfills and two closure units (X-749, X-749A, X-749B, X-231A & B) inside the site perimeter road. The volume assumes 50 percent soil and 50 percent debris and does not include landfills or closure units outside perimeter road.
- The 600,000 cubic yards of soil comes from the RCRA corrective actions that were deferred until D&D.
- Soil volume does not include any excavation of soil to address current areas of groundwater contamination.

If on-site disposal is selected, what current projected amounts would go on site or off site?

The waste breakdown would be designed to ship radionuclides that present the highest risk to human health and the environment off site while leaving low-risk material on site. Process gas equipment in the X-326 building has higher concentrations of Tc-99 and Uranium. A balanced approach would be used to leave the low radiological risk (but larger volume) waste on site and ship the higher radiological risk (but small volume) waste off site.

On-Site Disposal Alternative		
Waste Form	**Volume (cubic yards)**	
	Off Site and Recycled - Not Placed in OSDC	**Placed in On-Site Disposal Cell**
Debris, Miscellaneous Waste, Concrete and PGE	60,000	1,000,000
Process Gas Equipment (PGE)	40,000	280,000
Metals with high potential to recycle	110,000	0
Soil from D&D and RCRA soil clean-up program	0	600,000
Landfill debris	0	300,000
Landfill soil	0	300,000
Borrow fill soil required for debris placement	0	2,260,000
Total	**210,000**	**4,740,000**
Waste Volume by Percentage	**4%**	**96%**

Shipping X-326 process gas equipment off site produces these reductions on site		
Volume of D&D Debris	**Amount of Radioactivity (all Radionuclides)**	**Potential Risk to Humans**
3%	**50% lower**	**70% lower**

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WASTE DISPOSITION

Waste Streams and Volumes

The volumes shown in the table on page three are preliminary and are subject to change as the technical development and review of these estimates are concluded. The borrow fill soil is an estimate of the additional volume of soil required to place the estimated debris in a compliant manner in an On-Site Disposal Cell, if selected. This additional volume of soil is necessary to ensure the long-term stability of the disposal cell and is based on an industry standard of a 2:1 ratio of soil to debris. This quantity of soil could potentially come from off site, an on-site borrow area, useable spoils from the construction of the on-site disposal cell itself, and the potential excavation of contaminated soil associated with known areas of groundwater contamination.

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WASTE DISPOSITION

Long -Term Protectiveness

What is the long-term protectiveness evaluation?

The criteria "long-term protectiveness of human health and the environment" considers protectiveness of the alternatives as well as long term environmental effects. For purposes of the RI/FS evaluation, long term impacts are considered to begin when the last of the waste has been disposed in its final location.

What protectiveness criteria are being analyzed for the disposal alternatives?

- Permanence of the alternative
- Contaminant removal
- Cell penetration
- Long term performance
- Long term effectiveness of institutional controls
- Future land use

How do the disposal alternatives compare in long term protection?

Current analysis suggests the following.

	On-Site Disposal	Off-Site Disposal
Permanence	Provide for effective isolation and containment of waste for 1,000 years through the design features of the facility and the waste acceptance criteria. Preliminary modeling results indicate that protection well beyond 1,000 years will be provided.	Off-site disposal facility will meet EPA off-site policy and either DOE or NRC disposal regulations.
Contaminant removal	Additional lower cost disposal capacity and need for soil to blend with debris provides DOE flexibility to potentially remediate the site soil to cleaner standards or find other on-site sources of soil. On-site disposal cell could provide opportunity for consolidation of site landfills.	Disposal debris and soil exceeding cleanup levels shipped from the site. Existing Class C landfills on site remain intact and under permanent institutional controls.
Intrusion through disposal facility cap	The On and Off-Site alternatives are evaluated as the same.	
Institutional controls	Both facilities use institutional controls that would restrict approved access to the disposal facility site and prohibit actions that could penetrate the cover and expose the waste.	
Future land use	Land use within the fenced area	Other areas at the Portsmouth site could

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	surrounding the cell would be maintained under permanent institutional control with access restricted. On-site disposal cell could provide opportunity for consolidation of site landfills and improved ability to redevelop former process area footprint.	be released for other uses after completion of D&D and environmental restoration.

NEW INFO

What long term environmental effects are being evaluated?

Current analysis suggests the following:

Air Quality

- On-site disposal – Disposal cell cap designed to prevent long-term impacts to air quality at PORTS; no long term impacts to air quality anticipated.
- Off-site disposal – No long-term impacts to air quality are anticipated at PORTS or in its vicinity from implementation of this alternative; no long-term impacts to air quality are expected from the inclusion of PORTS waste at the receiving facilities.

Surface Water Quality

- On-site disposal – No long-term impacts to surface water are anticipated at PORTS or in its vicinity from implementation of this alternative. OSDC must be designed, constructed, and maintained to prevent releases of contaminants or nuisances (such as turbidity) that could adversely affect surface water quality. OSDC design would include installation and operation of leachate collection and treatment system.
- Off-site disposal – No long-term impacts to surface water are anticipated at PORTS or in its vicinity from implementation of this alternative. Waste materials removed from site.

Groundwater Quality

- On-site disposal – Design, operation, waste acceptance criteria and ongoing maintenance of the OSDC ensures that groundwater quality is maintained and protective of human health and the environment for at least 1,000 years. All Ohio EPA water quality standards would be met for at least 1,000 years.
- Off-site disposal – No long-term impacts are anticipated at PORTS or in its vicinity from implementation of this alternative.

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Long -Term Protectiveness

Land and animal resources

- On-site disposal – Design features of the OSDC would preclude burrowing animals and any roots of plant on the footprint of the OSDC.
- Off-site disposal – No long-term impacts to biota are anticipated at PORTS or its vicinity from implementation of this alternative.

Wetlands and aquatics

- On-site disposal – Potential for impacts to aquatic resources in the vicinity of the disturbed area, primarily the adjacent tributaries, would significantly decrease following closure of the disposal cell.
- Off-site disposal – No long-term impacts to wetlands and aquatic or visual resources are anticipated at PORTS or in its vicinity from implementation of this alternative.

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WASTE DISPOSITION

Construction Details and Impacts

How will the OSDC be presented in the RI/FS?

The OSDC presented in the RI/FS will be a representative OSDC and thus the design information used to evaluate this alternative does not necessarily represent the final design. The conceptual on-site disposal cell (OSDC) footprint is approximately 70 acres. The facility will be approximately 100 ft high from the sub-grade bedrock floor to the top of the final cap, but still lower than the highest hill in the surrounding area which is about 835' above the mean sea level. The facility represented in the RI/FS is in the shape of an elongated pyramid and would be similar to the height of the existing process buildings (e.g., X-333) and would be roughly twice the footprint of the X-333 Building.

The final design of the OSDC may differ from this representative configuration in order to optimize the footprint and incorporate comments from Ohio EPA.

What is the capacity of the OSDC evaluated in the RI/FS?

The evaluated available capacity is approximately 5 to 6 million cubic yards at Area D. That is considered a sufficient capacity for the on-site alternative.

Could an OSDC withstand an earthquake or other natural disasters?

Requirements set forth in the ARARs require seismic stability analysis to be performed during detailed design with appropriate design features incorporated in order to remain stable under reasonable maximum earthquake and storm events in the area. Note that the Portsmouth Site is not near a Holocene fault and therefore the likelihood of a significant earthquake event is very low.

What could be placed in an OSDC?

The facility evaluated in the RI/FS would be designed and operated to accept low level radioactive waste (LLW), Toxic Substance Control Act (TSCA) waste (i.e., PCBs), Resource Conservation and Recovery Act (RCRA) waste, and mixtures of these wastes, all of which must meet waste acceptance criteria (WAC) approved by Ohio EPA. The potential OSDC would accept debris or soil waste forms only; it would not accept liquid waste or other waste that does not meet the WAC.

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Construction Details and Impacts

How does an OSDC compare to the existing landfills on site?

Some of the existing landfills on site are not lined and do not have leachate collection and treatment systems. Additionally, they are capped with approximately 3 feet of compacted clay only, consistent with standard RCRA (and State of Ohio) capping designs in place at the time of their construction. A new OSDC contemplated by the RI/FS would have a more robust liner system and a thicker, more protective cap.

How protective would an OSDC be? Would it leak?

The potential OSDC will combine the best geology on site, best engineering design, best construction materials, best construction QA/QC, and post-closure monitoring and maintenance to ensure long-term protectiveness for at least 1,000 years after completion. No significant impact to human health or environment is expected for at least 1,000 years as required by ARARs.

During the design process the on-site disposal facility must be demonstrated to remain protective of human health and the environment for 1,000 years. This is done by considering both performance standards (i.e., not to impact human health and the environment) and design standards (i.e., to include specific engineered components in the multi-layer liner and cover as well as leachate collection and leak detection systems). The OSDC must be designed and operated to capture leachate that is generated from the waste and then treated in a wastewater treatment facility during the initial dewatering phase following placement. Post closure leachate generation is expected while the placed waste dry out, usually within the first 10 years, and will be collected inside the OSDC and sent to the treatment facility. This is not leak from OSDC and will not impact the environment.

The OSDC siting and engineering design will be reviewed and approved by Ohio EPA prior to construction. Construction certification will be submitted and approved by Ohio EPA prior to waste placement. Also all necessary institutional controls and long-term monitoring and maintenance approaches will be specified in the Closure Plan to be reviewed and approved by Ohio EPA. Ohio EPA will continue to oversee the implementation of the plan and conduct effectiveness review every 5 years.

The OSDC is not expected to develop any significant leaks within its design life span of 1,000 years. However, in order to ensure long-term protectiveness, it is also assumed that the manmade materials incorporated into the facility will degrade within 1,000 years which will increase water infiltration into and possibility of significant leaks from the OSDC. Based on these assumptions, conservative waste acceptance criteria (WAC) will be developed to limit the level of contamination which could be placed in the OSDC. The WAC would be specifically established so if there are significant leaks as a result of failure of the manmade materials, those

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leaks would not adversely impact human health or the environment, thereby maintaining the required long-term protectiveness.

What is the difference in potential health risk to the community, such as potential cancer risk, between an OSDC alternative and the off-site disposal alternative?

There is no difference in the health risk protection objectives that must be achieved between an OSDC alternative and the off-site disposal alternative. Both must be protective and must achieve the EPA criteria of protecting underlying groundwater and result in an acceptable Excess Lifetime Cancer Risk (ELCR) target specified in the Superfund regulations for decision-making of falling within the acceptable risk range of 1 in 10,000 (1×10^{-4}) and 1 in 1,000,000 (1×10^{-6}) ELCR. Both alternatives must also be protective for other health effects that are not cancer related, that are addressed by the Superfund regulations with a protective measure known as the Hazard Index, or HI. Superfund cleanup and disposal decisions must result in a HI protective value of less than 1. It is therefore important to recognize that the nation's cleanup regulations have established protective targets for residual contamination that is present in soil or groundwater following cleanup, or for materials that have been placed in disposal facilities for permanent disposal. While these risk targets are not "zero risk" targets, they are recognized as health protective by the environmental regulatory agencies at the state and federal level (EPA and Ohio EPA). They are the same risk targets that are used to set acceptable contamination levels in drinking water under the Safe Drinking Water Act, which are known to the public as Maximum Contaminant Levels, or MCLs. An example would be the MCL for lead (15 parts per billion), which, while not zero, is an established level that is considered safe by our regulatory agencies for consumption by users of the public water supply.

An OSDC must therefore be designed to achieve the Superfund protective targets over the long term, and monitored to demonstrate to the satisfaction of the regulatory agencies that releases from the OSDC are not occurring. Local members of the community should not be subjected to any additional risk of exposure provided the OSDC is designed, constructed, and monitored as required by the regulations. Those regulations also require that the engineering design and health effects modeling projections be made out to a performance period of 1000 years, from which protective Waste Acceptance Criteria (WAC) are then established to ensure the facility is designed and constructed as intended.

It is important to note that all of the waste materials that would be disposed of in a potential OSDC are already here at the PORTs site, and no new waste would be brought in from other sites to be disposed of in the facility. The waste materials would result from dismantlement of the facility and completion of soil and groundwater cleanup. An OSDC alternative therefore results in a long-term improvement of the current condition by consolidating materials from the plant into a smaller footprint so that the other land areas outside the disposal footprint could be made available for alternate use. Thus the waste materials and contamination levels are

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already here at the PORTs site; the decision is one of where to consolidate them for permanent disposition and monitoring. No additional sources of contamination are being brought to the PORTs situation under this decision.

Along with the engineering and waste acceptance requirements for the facility, the Superfund regulations also require institutional arrangements and controls to ensure that long-term engineering and monitoring obligations are met and the facility meets the intentions of a permanent disposal facility. Most notably, these arrangements would involve continued federal ownership of the disposal facility area, and the use of 5-year administrative reviews by Ohio EPA to review performance of the facility and note any maintenance or monitoring adjustments. The 5-year review process is a requisite of the Superfund program and is conducted at all permanent disposal facilities and any sites where residual soil or groundwater contamination is left at levels above those that permit unrestricted use of the property. In essence, the 5-year reviews are mankind's intent to pass knowledge of the permanent disposal facilities (and sites that have levels of contamination above unrestricted use levels and therefore need institutional arrangements) from generation to generation for the foreseeable future.

In summary, if the OSDC is constructed and maintained properly, all waste meets the WAC, and monitoring is conducted for the foreseeable future, there should be no exposures to the community or releases to groundwater above acceptable Superfund health-based levels due to the day to day presence of the facility. Like all disposal facilities where the waste is still present for the long term, it is acknowledged that if there were to be a loss of institutional controls over the disposal facility area at some point in the future, and a major intrusion into the D&D waste disposed of in the OSDC occurred due to the loss of institutional control, health impacts to the hypothetical intruder could occur above acceptable limits. This would be considered a failure scenario that the required institutional arrangements and 5-year reviews are responsive to, and designed to prevent.

Would an OSDC impact the housing and property values in the surrounding area?

Any projection of the impact of the construction of an on-site disposal cell on the values of the surrounding property is highly speculative, difficult to isolate, and impacted by many other contributing factors. Significant factors impacting such an assessment include the economic outlook and conditions in the surrounding area, conditions of other neighboring land, and the activities or operations underway within the industrial footprint of the remainder of the facility. At PORTs the ability to project such impact would be highly depending not only by the economic conditions at the time, but also by the status of the cleanup project being conducted in parallel with landfill construction, and the status of the remaining industrial operations at the site.

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Construction Details and Impacts

Setting these complicating factors aside, many studies have been conducted in communities within the U.S. and in Canada on the impacts of landfill construction on property values. These studies have principally focused on sanitary landfill construction and are readily available via a search on the internet. While difficult to summarize the results of all these studies, it can be noted that in general such studies found that:

- Property values were impacted during the operation life of the landfill.
- Impacts were not found in all cases studied involving low volume landfills but where found, were isolated to the immediate area of the landfill.
- Impacts were more pronounced in suburban residential areas near major population centers, with much less impact in predominantly rural areas.
- The time period of impact was limited to the operational life of the facility with a rebound or in some cases a pronounced increase in property values following the closure of the landfill.

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WASTE DISPOSITION

Siting of an On-Site Disposal Cell

What are the siting criteria used in the RI/FS for an on-site disposal cell?

To be considered an initial candidate site, the site for an OSDC had to be located entirely within DOE-owned property, contain at least 150 contiguous acres, and not be technically or administratively impracticable or cost prohibitive. Using these criteria, 16 potential sites were identified and screened against individual criteria categorized as threshold, modifying, or final criteria.

Other siting criteria include hydrogeologic conditions beneath the sites, the initial fate and transport analyses performed (i.e., preliminary waste acceptance criteria evaluation), and overall protectiveness.

Finally, the SSAB recommended the following criteria be considered in siting a potential OSDC:

- Possible use of multiple smaller cells
- Ensure minimal footprint/waste minimization/recycling
- Reuse existing landfills if possible
- Areas not conducive for reuse should be considered
- Consider impact on cultural resources
- Blend with existing terrain
- No off-site waste accepted
- Community benefit-land use management plans should be developed
- Cells should be latest cell technology
- Additional education for community members
- Complimentary use of cell space (solar panels, wind farms, etc.)
- Industrial use clean-up standard.

Based on these criteria, the RI/FS considered four sites known as A, B, C and D. A site located in the northeastern corner of the DOE reservation, known as Site D, is used in the RI/FS as the representative site for evaluation purposes. (Refer to the "Waste Disposition Description and Scope of Alternatives" Information Portfolio for the rationale of selecting Site D as the representative site.)

What Federal and State regulations will need to be followed in siting?

The federal and state siting requirements and considerations can be grouped generally as floodplains, wetlands, seismic considerations, hydrologic considerations, suitable terrain, land use, buffers, and ecological and cultural considerations.

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Siting of an On-Site Disposal Cell

TSCA. The TSCA chemical waste landfill design requirements in 40 CFR 761.75 generally follow the RCRA landfill design requirements, but TSCA also specifies that the bottom of the landfill liner system must be located 50 feet above the historical high groundwater mark and that there must be no hydrologic connection between the site and any surface water (40 CFR 761.75[b][3]).

RCRA. The federal and State of Ohio regulations for siting RCRA Subtitle C hazardous waste disposal landfills include floodplain and seismic considerations, as well as siting restrictions. Hazardous waste disposal facilities must not be located within 200 feet of a fault that had displacement in Holocene time and must not be located within the boundaries of a state park or state park purchase area, a national park or recreation area, or a national park candidate area.

Ohio solid waste regulations. Ohio's rules (OAC 3745-27) for siting solid waste disposal facilities identify five location restriction demonstrations: airport safety, regulatory floodplain, Holocene fault, seismic impact zone and unstable area. A landfill cannot be located within a "regulatory floodplain," in a "seismic impact zone," or in an "unstable area" as these terms are defined in OAC 3745-27-01. A landfill cannot be located within 200 feet of a Holocene fault or within 10,000 feet of any airport runway end used by turbojet aircraft or within 5,000 feet of any airport runway end used by only piston-type aircraft. Solid waste cannot be placed within 300 feet of a landfill's property line, within 1,000 feet of a residence; or within 200 feet of a stream, lake or natural wetland. A solid waste landfill cannot be located above a sole source aquifer (a sole source aquifer is federally designated as an area's primary source of water), in areas surrounding a public water supply well, or above an unconsolidated source of water, like sand or gravel beds, that are capable of supplying 100 gallons per minute of water to a well that is within 1,000 feet of where solid waste is placed.

Low-level radioactive waste. DOE Order 435.1-1 does not set specific siting restrictions for LLW disposal facilities, but do require that proposed locations be evaluated considering environmental characteristics, geotechnical characteristics, and human activities, including whether it is located in a floodplain, a tectonically active area, or in a zone with water table fluctuation. The Order requires that proposed locations with environmental and geotechnical characteristics, and human activities for which adequate protection cannot be provided through the facility design be deemed unsuitable for the location of the facility.

Will you need any waivers of regulatory requirements?

Not at this time. At least one of the four sites can satisfy the regulatory requirements.

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Siting of an On-Site Disposal Cell

What tests will need to be done at any potential sites?

Development and evaluation of the on-site alternative requires data on hydrogeologic and geochemical properties of soil and rock for subsurface flow and transport modeling and analytical WAC development. Geotechnical data are also needed to determine soil properties such as subsidence, compaction, and permeability, all of which are requirements for detailed design.

For these data collection efforts, several intrusive field methods have been used to obtain the required geotechnical, geochemical, and analytical data, as outlined in *Geotechnical Sampling and Analysis Plan for the Sitewide Waste Disposition Evaluation Project at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2011), referred to as the Geotechnical SAP which has been approved by Ohio EPA. These methods include, but are not limited to, cone penetration testing (CPT), drilling in both unconsolidated and bedrock formations to collect soil samples for geotechnical and geochemical testing, and installation of monitoring wells and piezometers to measure the presence of subsurface water and its associated characteristics.

What is the process to finalize the site selection?

Final alternative selection regarding on-site or off-site disposal will be made in the Record of Decision after all input has been received and appropriately addressed. The RI/FS will identify a representative site for the purposes of evaluating the on-site disposal alternative. In addition, siting information will be included in an appendix to the RI/FS. The final site will be selected during the design of the clean-up remedy, if on-site disposal is selected as the final option.

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Long Term Monitoring and Maintenance

What must be monitored during OSDC operations and after closure?

The quality and level of contamination in environmental media, including groundwater, surface water, and air must be monitored and reported at least quarterly during operations. Samples would be collected and analyzed for persistent and mobile constituents present in the waste to determine whether contamination has migrated or released from the OSDC. If so, corrective measures would be taken as necessary.

Groundwater monitoring at multiple locations and in various depths would continue after the OSDC is closed to ensure long-term effectiveness of the OSDC cover and liner systems. Monitoring would also occur long term for the internal leak detection system, flow in the leachate collection system, and the OSDC cover system integrity. Specific institutional controls and monitoring and maintenance plan will be developed, approved by Ohio EPA, and implemented. All the monitoring data will be evaluated to determine the effectiveness of the OSDC on a routine basis. Comprehensive reviews will be conducted by DOE and Ohio EPA every 5 years.

What would maintenance activities involve? Who will do the work?

Surveillance and maintenance activities would occur immediately following facility closure according to the closure plan. It is likely that a subcontractor would be selected to perform the surveillance and maintenance, which would include, but not be limited to, site inspections, operation of the leachate treatment system, maintenance of the facility, and environmental media sampling.

How long will DOE continue to monitor and maintain the disposal facility?

Permanent institutional control of the OSDC is required and will be implemented. In accordance with DOE Orders, as long as LLW is disposed, DOE, or its successor must maintain surveillance of the facility for the foreseeable future. DOE Order 458.1 specifically requires DOE to monitor and maintain a site where residual radioactivity remains. This commitment ensures DOE's long-term presence at any site with an on-site disposal facility. Ohio EPA will also conduct 5-yr review of the OSDC effectiveness.

How will Ohio EPA be involved?

As the principal regulatory oversight body for DOE at PORTS, Ohio EPA will review and approve all the OSDC siting, design, construction certification, and closure plan to ensure full regulatory compliance and long-term protectiveness.

Ohio EPA is expected to implement the conditions and requirements of the Order that guide D&D and waste disposition activities at PORTS (i.e., DFF&O) to ensure compliance. Regular joint DOE/Ohio EPA inspections would occur during D&D and OSDC operation.

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Impacts to Cultural and Natural Resources

Are there any sensitive cultural and natural resources in the potential OSDC footprints?

Some potentially sensitive cultural and natural resources are present in the final candidate study areas, which have been considered in the siting study. The RI/FS will identify any sensitive cultural and natural resources that may be impacted by the OSDC. As required, the RI/FS will also outline proposed mitigation measures to address impacts to sensitive resources. Final mitigation measures will be documented in the Waste Disposition Record of Decision.

Will DOE protect those resources?

Protection of both cultural and natural resources is required by the ARARs for the waste disposal alternatives. Therefore, DOE is compelled to ensure protection or if necessary, appropriately mitigate any adverse impacts on such resources.

How does DOE plan to satisfy the NEPA and NHPA requirements?

In accordance with the DFF&O, NEPA values are incorporated into the evaluation of remedial alternatives. In addition, NHPA requirements are incorporated as part of the ARARs for the on-site waste disposal alternative. Therefore, the requirements of NEPA and NHPA are part of the overall evaluation.

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Opportunity for Landfill Consolidation

Will DOE consolidate all the existing landfills into the new facility?

The potential volume of waste associated with the existing landfills located on the central and southern area of the PORTS Site are accounted for in the total capacity for the 5 to 6 million cubic yard OSDC conceptual design. In part due to interest expressed by the SSAB in consolidating existing site landfills, the high-end volume case for the waste disposition RI/FS plans for the ability to consolidate landfills within Perimeter Road. Existing landfills north of Perimeter Road (i.e., X-734 and X-735) are newer designs and are not currently being considered for consolidation. The decision to excavate existing landfills (e.g., X-749, X-749A, and X-749B) and consolidate the waste into a potential OSDC would fall under the Ohio Consent Decree, and is therefore a decision to be made outside the Waste Disposition Evaluation decision. No decision has been made to consolidate any of the existing landfills.

How much of extra capacity (beyond D&D requirements) exists with the current OSDC conceptual layout?

The most current layout shows capacity of 6 million cubic yards (cy) may be achievable in Area D. The current high-end volume estimate requires 5 million cy disposal volume. This includes D&D waste, soil remediation waste, 300,000 cy landfill debris, and 300,000 cy landfill soil from the five landfills and closure units within perimeter road. Nearly 1 million cy of extra capacity may still be available for future D&D wastes from the DUF6 facility. However no decision has been made regarding the OSDC size or landfill consolidation yet.

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Other Site Disposal Cells for Comparison

What other DOE sites have on-site disposal facilities?

DOE has three operating CERCLA waste disposal facilities in Oak Ridge, Tennessee; Hanford, Washington and; Idaho Falls, Idaho.

DOE has completed and closed three CERCLA disposal facilities in Fernald, Ohio; Weldon Springs, Missouri, and Monticello, Utah.

DOE has active LLW disposal facilities that are regulated by DOE Order 435.1 "Radioactive Waste Management" under its Atomic Energy Act authority. The facilities are located in Savannah River, South Carolina; Nevada Nuclear Security Site, Nevada; Hanford, Washington; Los Alamos, New Mexico, and; Idaho Falls, Idaho.

DOE also manages 19 Title I Uranium Mill Tailing Sites across the country including Canonsburg, Pennsylvania to Grand Junction, Colorado. Each of these sites is also independently licensed by the U.S. Nuclear Regulatory Commission. Each of these sites has its own disposal facility, some onsite and some on land purchased adjacent to the site.

DOE did not dispose waste on-site at it's facilities in Miamisburg, OH or Rocky Flats, CO. Instead, DOE chose a remedy that involved minimal soil excavation and permanently leaving buildings foundations in place underground.

What are the typical disposal facility designs?

The majority of DOE waste disposal facilities are LLW/RCRA/TSCA compliant facilities with multi-layer base liners and caps that can provide required long-term protectiveness, much like the one under consideration at PORTS.

What are the important lessons learned from those facilities?

DOE maintains an elaborate lessons learned exchange between sites. The Department shares lessons learned on natural and man-made cover systems, leachate collection experiences, operational experiences, and all considered lessons learned that can be applied to disposal sites across the complex to preclude the risk of subsidence or to improve the performance of other important design features. An interesting data point is that the amount of leachate being collected from on-site disposal facilities closed within the last ten years has essentially slowed to the point where leachate is only collected a few times a year. This reduced leachate indicates that the engineered systems and natural components of the disposal facilities are performing as intended. DOE has also found environmental monitoring from these sites to be acceptable. DOE has also

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learned that on-site waste disposal is the least expensive waste management alternative, relative to off-site disposal options, and has resulted in the highest ratio of risk reduction per dollar spent.

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Future Use Considerations for Disposal Site

Will an on-site disposal cell constrain potential future land uses of PORTS?

Future land use is a criterion considered for siting of a potential on-site disposal cell. While final end-state decisions for PORTS have not been made at this time, it is DOE's intent to consider the impacts of on-site disposal on potential industrial uses of the site. To the degree practicable, DOE will attempt to minimize the impact of any on-site disposal alternative under consideration in the RI/FS on potential future industrial uses.

What multi-purpose considerations has the SSAB previously recommended for an OSDC?

In Recommendation 11-01, Siting Criteria for a Potential CERCLA Cell, the SSAB requested the following future use items be considered.

- Reuse Existing Landfills if possible
- Areas not conducive for reuse should be considered
- Consider Impact on Cultural Resources
- Blend with Existing Terrain
- Community Benefit-Land Use Management Plans should be developed
- Complimentary Use of Cell Space (Solar Panels, Wind Farms, etc.)
- Industrial Use Clean-up Standard

Which of these options would be technically feasible?

Current considerations of on-site disposal in the RI/FS take into account the recommendations to consider the impact on cultural resources, blend an OSDC with existing terrain, and allow the site to meet an industrial cleanup standard. The RI/FS plans for the opportunity to allow existing landfills to be consolidated into a new OSDC, should one be constructed, and places the cell in a site that is perceived as less desirable for potential future industrial use than the main process area where utilities and infrastructure are more readily available. Use of the OSDC slope for solar panels may be technically feasible.

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